The kidnapping Problem of Mobile Robots: A Set Membership Approach.

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Résumé en anglais	This paper presents a set membership methodto deal with the kidnapping problem in mobile robotics. By using a range sensor, the odometry and a discrete map of an indoor environment, a robot has to detect a kidnapping situation, while performing a pose tracking, and then perform a global localization to estimate its new pose (position and orientation). In a bounded error context the IAL (Interval Analysis Localization) algorithm searches a small box (interval vector) that includes the robot's pose, using interval analysis and constraint propagation tools. This algorithm allows to perform a pose tracking and a global localization. Using this algorithm, it is possible to deal with the kidnapping problem. This method is tested using real data, recorded during the CAROTTE challenge, organized by the French ANR (National Research Agency) and the French Army. As it is shown in this paper with the IAL algorithm, interval analysis is an efficient tool to solve the kidnapping problem.
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